IN THE CLAIMS

Please amend claims 1, 3 and 14, and add claims 21 and 22, as follows:

1. (Currently Amended) A seek-servo apparatus of a hard disk drive capable of moving a head to a desired track location, the seek-servo apparatus comprising:

receiving means for receiving an acceleration command having a target acceleration which leads a target velocity and a target position by a predetermined time; and

an actuator which moves the head to the desired track location in response to [[an]] the acceleration command having [[a]] the target acceleration which leads [[a]] the target velocity and [[a]] the target position by [[a]] the predetermined time.

2. (Original) The seek-servo apparatus of claim 1, wherein the predetermined time includes the time that it takes to compute the acceleration command and the time that it takes for the actuator to vary a torque of the head in response to the computed acceleration command.

3. (Currently Amended) The seek-servo apparatus of claim 1, further comprising:

an adding/subtracting unit which subtracts a feedforward acceleration of the head from a result of adding a velocity correction value to the target acceleration to obtain a result of subtraction, and which outputs [[a]] the result of subtraction as the acceleration

command <u>to the receiving means</u>; and

an estimator which estimates the feedforward acceleration of the head based on the acceleration command and position information concerning a position of the head moved;

wherein the actuator outputs the position information to the estimator.

4. (Original) The seek-servo apparatus of claim 3, wherein the velocity correction value is obtained by adding a position correction value to the target velocity, subtracting an estimated actual velocity of the head from a result of adding the position correction value to the target velocity, and proportionally integrating a result of subtracting the estimated actual velocity of the head from a result of adding the position correction value to the target velocity; and

wherein a position correction value is obtained by subtracting an estimated actual position of the head from the target position and proportionally integrating a result of subtracting the estimated actual position of the head from the target position; and

wherein the estimator estimates an actual velocity and an actual position based on an acceleration command output from the adding/subtracting unit and a position information output from the actuator.

5. (Original) The seek-servo apparatus of claim 4, wherein the actuator comprises:

a delayer which delays an acceleration command output from the

adding/subtracting unit for the predetermined time and outputs a result of delaying the acceleration command;

a first integrator which integrates the result of delaying the acceleration command and outputs a result of integration; and

a second integrator which integrates the result of integration and then outputs an integrator result as the position information to the estimator.

6. (Original) The seek-servo apparatus of claim 3, wherein the actuator comprises:

a delayer which delays an acceleration command output from the adding/subtracting unit for the predetermined time and outputs a result of delaying the acceleration command;

a first integrator which integrates the result of delaying the acceleration command and outputs a result of integration; and

a second integrator which integrates the result of integration and outputs an integrator result as the position information to the estimator.

7. (Original) The seek-servo apparatus of claim 6, wherein the target acceleration is derived by the equation

$$a_w(n+1) = \frac{2\pi X_{SK}}{N_{SK}^2 T_{SM}^2} \sin \frac{2\pi (n+1)}{N_{SK}}$$

where $a_w(n+1)$ represents the target acceleration, n represents a servo sample number, X_{SK} represents a seek length, and N_{SK} represents a seek time per a sample; and

wherein the target velocity is derived by the equation

$$v_w(n) = \frac{X_{SK}}{N_{SK}T_{SM}}[1 - \cos(\frac{2\pi n}{N_{SK}})]$$

where $v_w(n)$ represents the target velocity and T_{SM} represents a servo sampling time; and

wherein the target position is derived by the equation

$$y_w(n) = \frac{X_{SK}}{N_{SK}}n - \frac{X_{SK}}{2\pi}\sin\frac{2\pi n}{N_{SK}}$$

where $y_w(n)$ represents the target position.

8. (Original) The seek-servo apparatus of claim 5, wherein the target acceleration is derived by the equation

$$a_w(n+1) = \frac{2\pi X_{SK}}{N_{SK}^2 T_{SM}^2}\sin\frac{2\pi(n+1)}{N_{SK}}$$

where $a_w(n+1)$ represents the target acceleration, n represents a servo sample number, X_{SK} represents a seek length, and N_{SK} represents a seek time per a sample; and

wherein the target velocity is derived by the equation

$$v_w(n) = \frac{X_{SK}}{N_{SK}T_{SM}}[1 - \cos(\frac{2\pi n}{N_{SK}})]$$

where $v_w(n)$ represents the target velocity and T_{SM} represents a servo sampling time; and

wherein the target position is derived by the equation

$$y_w(n) = \frac{X_{SK}}{N_{SK}}n - \frac{X_{SK}}{2\pi}\sin\frac{2\pi n}{N_{SK}}$$

where $y_w(n)$ represents the target position.

9. (Original) The seek-servo apparatus of claim 2, wherein the predetermined time is equivalent to a unit servo sample.

10. (Original) The seek-servo apparatus of claim 1, wherein the actuator comprises:

a delayer which delays an acceleration command output from the adding/subtracting unit for the predetermined time and outputs a result of delaying the acceleration command;

a first integrator which integrates the result of delaying the acceleration command and outputs a result of integration; and

a second integrator which integrates the result of integration and then outputs an integrator result as the position information to the estimator.

11. (Original) The seek-servo apparatus of claim 1, wherein the target acceleration is derived by the equation

$$a_w(n+1) = \frac{2\pi X_{SK}}{N_{SK}^2 T_{SM}^2} \sin\frac{2\pi(n+1)}{N_{SK}}$$

where $a_w(n+1)$ represents the target acceleration, n represents a servo sample number, X_{SK} represents a seek length, and N_{SK} represents a seek time per a sample.

12. (Original) The seek-servo apparatus of claim 1, wherein the target velocity is derived by the equation

$$v_w(n) = \frac{X_{SK}}{N_{SK} T_{SM}}[1 - \cos(\frac{2\pi n}{N_{SK}})]$$

where $v_w(n)$ represents the target velocity and T_{SM} represents a servo sampling time.

13. (Original) The seek-servo apparatus of claim 1, wherein the target position is derived by the equation

$$y_w(n) = \frac{X_{SK}}{N_{SK}} n - \frac{X_{SK}}{2\pi} \sin \frac{2\pi n}{N_{SK}}$$

where $y_w(n)$ represents the target position.

14. (Currently Amended) A seek-servo method, comprising the [[stpes]] steps of:

providing a head in a hard disk drive[[,]];

receiving an acceleration command having a target acceleration which leads a target velocity and a target position by a predetermined time; and

moving the head to a desired track location using [[an]] the acceleration command having [[a]] the target acceleration which leads [[a]] the target velocity and [[a]] the target position by [[a]] the predetermined time.

15. (Original) The method of claim 14, wherein the predetermined time includes the time that it takes to compute the acceleration command and the time that it takes to vary the torque of the head in response to the computed acceleration command.

16. (Original) The method of claim 14, wherein the acceleration command is obtained by subtracting a feedforward acceleration of the head from a result of adding a velocity correction value to the target acceleration, and wherein the feedforward acceleration of the head is estimated based on the acceleration command and position information concerning a position of the head moved.

17. (Original) The method of claim 16, wherein the velocity correction value is obtained by adding a position correction value to the target velocity, subtracting an estimated actual velocity of the head from a result of adding the position correction value to the target velocity, and proportionally integrating a result of subtracting the estimated actual velocity of the head from a result of adding the position correction value to the target velocity; and

wherein a position correction value is obtained by subtracting an estimated actual position of the head from the target position and proportionally integrating a result of subtracting the estimated actual positionof the head from the target position; and

wherein an actual velocity and an actual position are estimated based on an acceleration command output and a position information output.

18. (Original) The method of claim 14, wherein the target acceleration is derived by the equation

$$a_w(n+1) = \frac{2\pi X_{SK}}{N_{SK}^2 T_{SM}^2} \sin\frac{2\pi(n+1)}{N_{SK}}$$

where $a_w(n+1)$ represents the target acceleration, n represents a servo sample number, X_{SK} represents a seek length, and N_{SK} represents a seek time per a sample.

19. (Original) The method of claim 14, wherein the target velocity is derived by the equation

$$v_w(n) = \frac{X_{SK}}{N_{SK} T_{SM}}[1 - \cos(\frac{2\pi n}{N_{SK}})]$$

where $v_w(n)$ represents the target velocity and T_{SM} represents a servo sampling time.

20. (Original) The method of claim 14, wherein the target position is derived by the equation

$$y_w(n) = \frac{X_{SK}}{N_{SK}} n - \frac{X_{SK}}{2\pi} \sin\frac{2\pi n}{N_{SK}}$$

where $y_w(n)$ represents the target position.

21. (New) The seek-servo apparatus of claim 1, wherein the target acceleration is

represented by the equation

$$
\begin{aligned}
u_E(t) &= \ddot{y}_w(t+T_d') + K_v[\dot{y}_w(t) - \dot{y}(t)] + K_p[y_w(t) - y(t)] \\
&= a_w(t+T_d') + K_v[v_w(t) - v(t)] + K_p[y_w(t) - y(t)]
\end{aligned}
$$

where $\ddot{y}_w(t+T_d')$ represents the target acceleration $a_w(t+T_d')$ which leads the target velocity $v_w(t)$ and the target position $y_w(t)$ by the predetermined time Td', Kv and Kp represent a velocity constant and a position constant, respectively, and $\dot{y}w(t)$ represents the target velocity $v_w(t)$.

22. (New) The seek-servo apparatus of claim 14, wherein the target acceleration is represented by the equation

$$
\begin{aligned}
u_E(t) &= \ddot{y}_w(t+T_d') + K_v[\dot{y}_w(t) - \dot{y}(t)] + K_p[y_w(t) - y(t)] \\
&= a_w(t+T_d') + K_v[v_w(t) - v(t)] + K_p[y_w(t) - y(t)]
\end{aligned}
$$

where $\ddot{y}_w(t+T_d')$ represents the target acceleration $a_w(t+T_d')$ which leads the target velocity $v_w(t)$ and the target position $y_w(t)$ by the predetermined time Td', Kv and Kp represent a velocity constant and a position constant, respectively, and $\dot{y}w(t)$ represents the target velocity $v_w(t)$.